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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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Hindrick Freerk Bulthuis

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GEMFIRE c/o HAYNES BEFFEL & WOLFELD LLP

P.O. BOX 366

HALF MOON BAY, CA 94019

EXAMINER

PETKOVSEK, DANIEL

ART UNIT

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2874

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PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No. 10/536,570	Applicant(s) BULTHUIS ET AL.	
	Examiner DANIEL PETKOVSEK	Art Unit 2874	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on RCE amendment filed October 6, 2008.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-18 and 22-26 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 1-18, 25, and 26 is/are allowed.
- 6) ☒ Claim(s) 22-24 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 26 May 2005 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

This office action is in response to the RCE filed October 31, 2008 to enter the amendment filed October 6, 2008. In accordance with the amendment, claim 22 has been amended, while claims 19-21 have been canceled.

Claims 1-18 and 22-26 are pending.

Continued Examination Under 37 CFR 1.114

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114.

Applicant's submission filed on October 6, 2008 has been entered.

Allowable Subject Matter

2. Claims 1-18, 25, and 26 are allowed. The following is an examiner's statement of reasons for allowance: the closest prior art of record (Hashizume et al. NPL; Arai et al. '018; Hatanaka '510) does not teach or reasonably suggest, in combination, an optical branching component as claimed by sole independent claim 1 further in which the coupling *strength* of at least one optical coupler *monotonically decreases with increasing wavelength throughout* the operational wavelength region of the component. Claims 2-18, 25, and 26 are dependent upon claim 1. Also, see Applicant's arguments filed April 18, 2008, which explain how the closest prior art of record does not teach or reasonably suggest the limitation "the coupling *strength* of at least one said optical coupler *monotonically*

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decreases with increasing wavelength throughout (entire) the operational wavelength region of the component”.

Claim Objections

3. Claim 22 is objected to because of the following informalities: “MMI” should be defined as “multi-mode interference” at least once in the claim before using the abbreviated version. Appropriate correction is required.

Claim Rejections - 35 USC § 112

4. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims **particularly pointing out and distinctly claiming** the subject matter which the applicant regards as his invention.

5. Claims 22-24 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing **to particularly point out and distinctly claim** the subject matter which applicant regards as the invention. Regarding independent claim 22, the claim term “substantially straight along *distances sufficient to operate as a directional coupler*” is vague and ambiguous as to what the claim defines. The term is vague because the actual “distance” to operate a “directional coupler” is not defined; further this distance would not have been well known in the art. The term “sufficient” in no way clearly and unambiguously defines a waveguide distance in claim 22. Directional couplers are not identical, each able to work in different ways and have different waveguides lengths. Claims 23 and 24 are dependent from independent claim 22.

Claim Rejections - 35 USC § 102

6. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(a) the invention was known or used by others in this country, or patented or described in a printed publication in this or a foreign country, before the invention thereof by the applicant for a patent.

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

7. Claim 22 is rejected under 35 U.S.C. 102(a/b) as being anticipated by Hashizume et al. NPL (cited in IDS filed March 30, 2006).

Hashizume et al. NPL teaches (Figure 1, Design, Experimental Result) an optical coupler comprising two optical waveguides 1, 2 which bend away from one another along at least a portion of their lengths and which are coupled together along at least a portion of their lengths by at least one MMI waveguide which is configured to support at least two guided modes, and which, immediately adjacent the MMI waveguide, are in proximity with one another and are substantially straight, which clearly, fully meets Applicant's claimed structural limitations for independent claim 22.

As is noted above, the term "*substantially* straight along distances *sufficient* to operate as a directional coupler" is not given any patentable weight,

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since Applicant is not actually claiming a directional coupler in the device; however the waveguides 1/2 of Hashizume NPL are “close enough” to operate as a directional coupler as signals can go through MMI to the other waveguide and couple directionally.

8. Claim 22 is rejected under 35 U.S.C. 102(b) as being anticipated by Lai et al. NPL (cited IDS filed March 30, 2006).

Lai et al. NPL teaches (Figure 1, Configuration, Results) an optical coupler comprising two optical waveguides (see Fig. 1) which bend away from one another along at least a portion of their lengths (in the internal portion between two MMI's; since the waveguides are straight for a distance, then the top waveguide bends away) and which are coupled together along at least a portion of their lengths by at least one MMI waveguide which is configured to support at least two guided modes, and which, immediately adjacent the MMI waveguide, are in proximity with one another and are substantially straight and at distances “sufficient to” operate as a directional coupler, which clearly, fully meets Applicant's claimed structural limitations for independent claim 22.

As is noted above, the term “*substantially* straight along distances *sufficient* to operate as a directional coupler” is not given any patentable weight, since Applicant is not actually claiming a directional coupler in the device; however the waveguides of Lai et al. NPL are “close enough” in between MMI couplers to operate as a directional coupler as signals can go through either waveguide to the other waveguide and couple directionally.

Claim Rejections - 35 USC § 103

9. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

10. Claims 23 and 24 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hashizume et al. NPL (cited in Applicant provided IDS).

Hashizume et al. NPL teaches (Figure 1, Design, Experimental Result) an optical coupler comprising two optical waveguides 1, 2 which bend away from one another along at least a portion of their lengths and which are coupled together along at least a portion of their lengths by at least one MMI waveguide which is configured to support at least two guided modes, and which, immediately adjacent the MMI waveguide, are in proximity with one another and are substantially straight, which clearly, fully meets Applicant's claimed structural limitations for independent claim 22.

Hashizume et al. NPL does not *explicitly* teach the dependent claim limitations of claims 23 and 24, in which the optical coupler comprises a single MMI waveguide configured to support only two guided modes, or in which the optical coupler comprises two MMI waveguides each configured to support only two guided modes.

Regarding claims 23 and 24, Hashizume et al. NPL does not explicitly teach that the MMI waveguides are configured to support *only* two guided

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modes. The Hashizume et al. NPL reference is silent to this exact limitation. However, a person having ordinary skill in the art at the time the invention was made would have recognized that using optical waveguides that support only two modes would have been an obvious modification (if not actually inherent in Hashizume et al. NPL). Guiding only two modes would eliminate the chances for substantial errors to be passed in case of a malfunction in the coupling system. See *KSR v. Teleflex*, 127 S.Ct. 1727 (2007).

Response to Arguments

11. Applicant's arguments filed October 6, 2008 in the RCE amendment have been fully considered but they are not persuasive. Claims 22-24 are still anticipated or obvious to Hashizume NPL and/or Lai NPL. The claim amendments filed October 6, 2008 do not impart any structural limitations that patentably distinguish from the prior art. Further, amended independent claim 22 presents issues and a rejection under 35 U.S.C. 112, second paragraph as the claim is not vague and indefinite.

Inventorship

12. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor

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and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

Conclusion

13. Any inquiry concerning this communication or earlier communications from the examiner should be directed to DANIEL PETKOVSEK whose telephone number is (571)272-4174. The examiner can normally be reached on M-F 8:30-5PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Uyen Chau Le can be reached on (571) 272-2397. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Daniel Petkovsek/
Patent Examiner, Art Unit 2874
November 5, 2008

/Sung H. Pak/
Primary Examiner, Art Unit 2874